

PREVALENCE OF STRONGYLE AND ASCARID EGG SHEDDING BY HORSES IN THE UNITED STATES, 1998-1999

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Take Home Message

Higher levels of strongyle egg shedding were associated with deworming less than six times a year, failing to maintain overall cleanliness of the equine housing area, and failing to deworm new residents before addition to the herd. Operations that fed a continuous dewormer had lower levels of strongyle eggs shed on the operation. Unlike ascarids, strongyle egg shedding did not vary by age or season.

Introduction

Equine internal parasites can cause several medical problems including colic, anemia, diarrhea, weight loss, poor performance, and other problems. The USDA's National Animal Health Monitoring System (NAHMS) collected data on equine health and management practices from a representative sample of equine operations in 28 states^a as part of the Equine '98 study. One objective of the study was to investigate the occurrence of internal parasites in the U.S. horse population including potential seasonality and other factors associated with parasite egg shedding.

Materials and Methods

The initial sample of 2,904 equine operations represented 78.2% of U.S. horses and ponies and 78.0% of farms with horses and ponies. Operations were selected by the National Agricultural Statistics Service (NASS) and participation by horse operations in the study was voluntary. For more information on the study design and methods see the final descriptive report for the NAHMS Equine '98 study.¹ A total of 985 operations participated in the parasite portion of the study.

The number of horses sampled per operation was based on a sliding scale with a maximum of 20 sampled on operations with 50 or more resident horses. Fecal samples were shipped overnight to the National Veterinary Services Laboratories (NVSL) in Ames, Iowa. A modified Stoll's technique using Sheather's solution was used to perform a fecal flotation examination on each sample and the number of eggs in one gram of feces were counted. Eggs from large and small strongyles cannot be differentiated by fecal flotation alone and are thus reported here as one group. Horses shedding ten to 290 strongyle eggs per gram (epg) of feces were considered as shedding at a low level. Moderate and high levels were 300 to 590 epg and 600 or more epg respectively. An operation shedding level was calculated from the average number of strongyle eggs shed among all horses sampled on each operation.

All estimates are based on analysis of weighted data using SUDAAN^b allowing for inference to the overall horse population in the 28 participating states. For comparison of descriptive statistics, a 90% confidence interval was used [point

estimate $\pm (1.65 \times \text{SE})$]. Intervals that do not overlap suggest a significant difference ($p < 0.10$) between the levels of each factor being compared. Logistic regression using backward selection ($p < 0.05$) was utilized to identify management factors leading to increased risk of moderate or high levels of strongyle egg shedding on an operation.

Results

Fecal samples were collected from a total of 8,516 horses. Overall, 51.0% of horses had parasite eggs detected in their feces and 79.1% of operations had at least one horse shedding parasite eggs. The majority of parasite eggs detected were of the strongyle type (from 49.0% of horses and on 75.9% of operations), however the majority of horses (82.8%) were either shedding a low level of strongyle eggs or none at all. The majority of operations (78.4%) had either a low level of shedding on average among horses tested or no horses shedding strongyle eggs.

There was no effect of season or age of horse on strongyle egg shedding. Both the percentage of horses shedding moderate or high levels of strongyle eggs and the percentage of operations with an average of moderate or high levels of strongyle eggs shed among horses tested were significantly lower in the Western region than in the Southern or Central regions of the U.S. The percentage of horses shedding moderate or high levels of strongyle eggs was lower on operations with 20 or more horses (9.6%) than on operations with 1 to 5 horses (20.4%) and 6 to 19 horses (21.2%).

Factors found to increase the risk of an operation having a moderate or high level of strongyle egg shedding include having dewormed the majority of horses 18 months and older on the operation less than six times in the last twelve months; having the overall cleanliness of the equine housing area assessed as poor by the interviewer; never requiring new resident equine to be dewormed within the last 12 months before adding them to the operation; and having an operation located in the central region of the U.S.

Fewer horses shed ascarid eggs than strongyle eggs (3.5% of horses and 10.1% of operations). The percentage of horses shedding ascarid eggs was significantly higher for horses less than 18 months of age (17.3%) than for those 18 months of age or older (2.0%). Over twice as many horses shed ascarid eggs in the winter than in the summer, with over six times as many of the horses under 18 months of age shedding ascarid eggs in the winter than in the summer.

The study found that 96.8% of operations dewormed the majority of resident horses at least once in the previous 12 months. The percentage of operations with at least one horse shedding a detectable level of strongyle eggs was significantly lower for operations where resident horses were dewormed (75.1%) compared to operations where they were not dewormed (96.5%). Percentages of operations with moderate or high levels of strongyle egg shedding were similar, regardless of whether or not they dewormed the majority of horses. A total of 9.1% of operations fed a continuous dewormer to the majority of horses 18 months or older. No significant difference was detected in the percentages of operations with at least one horse shedding strongyle eggs, regardless of whether or not they fed continuous dewormer. However, the percentage of operations with moderate or high levels of strongyle egg shedding was

significantly lower for operations that fed a continuous dewormer (7.6%) compared to those that had not (23.5%).

Discussion

This is the first study investigating equine internal parasite eggs shedding on a national level in the United States. All samples were collected and tested using a similar protocol. The average level of strongyle egg shedding among all horses sampled on an operation was used for operation level risk factor analysis because one fecal test from an individual horse may not reflect the true level of strongyle infection in the individual and infection levels among individuals on the same operation may vary widely. The study was not designed to determine types of deworming products used, dates of administration, or to measure resistance to specific types of dewormers.

Unlike strongyle eggs, shedding of ascarid eggs varied by age of horse and season. Young foals typically ingest ascarid eggs in the summer and it may take up to 3 months for the parasites to mature before laying eggs in a foal's intestinal tract. Consequently, the foal may not shed ascarid eggs in its feces until the fall or winter. Although there were far fewer horses under 18 months of age sampled in the study than horses 18 months or older, the fact that over six times as many horses under 18 months of age shed ascarid eggs in the winter than in the summer explains why more than twice as many horses overall shed ascarid eggs in the winter than in the summer.

The lower levels of strongyle eggs shed by horses in the Western region of the U.S. may be due to a lower burden of infection because of a hotter, drier climate. It is not clear why more operations in the Central region of the U.S. were found to have an average of a moderate or high level of strongyle egg shedding compared to those in other regions. Perhaps this difference could be explained by factors not measured in this study.

A goal of any deworming program should be to keep strongyle and ascarid infections at a level that does not cause problems for the horses. Regular administration and rotation of dewormers can decrease the number of eggs being shed into the environment. This practice, along with removing manure on a regular basis, avoiding overcrowding, and deworming new additions before arrival will help reduce the environmental load of parasite eggs. Periodic surveillance with fecal flotation exams should be utilized to evaluate the success of any deworming program.

References

1. USDA. 1999. Part IV: Reference of Health Management for Horses and Highlighted Diseases, 1998. USDA:APHIS:VS, CEAH, National Animal Health Monitoring System. Fort Collins, CO #N309.599.

Footnotes

^aWestern region: CA, CO, MT, NM, OR, WA, WY; Central region: IL, IN, KS, MI, MN, MO, WI; Southern region: AL, FL, GA, KY, LA, MD, OK, TN, TX, VA; Northeast region: NJ, NY, OH, PA.

^bSUDAAN, Version 6.4, 1996. Research Triangle Park, NC.